

Toward a Common Language and Framework for Science

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Scientific Knowledge System consist of: (a) Subject area: knowledge is presented in the form of laws of functioning of physical phenomena, (b) Formal methodological area, common for all subject areas: knowledge is presented in form of general methods applicable to the description and analysis of diverse laws. Concepts, languages, and methods of (a) and (b), which exist as a common arsenal, represent and satisfy the researches needs only partially. Suggested approach allows overcome many of related difficulties by the common base language, common for all semantic levels. **Conceptual Basis of the Scientific Knowledge System Language - The Key Notions.** The key notion of the conceptual bases of suggested language is an experimental fact, its description revealing the elementary property of a material object under certain conditions of the reality. The properties of a material object presented through the description of the laws and their manifestation define the object along with the laws that determine the probability of manifestation of the object's properties at certain instants of the objects lifetime. The variation of this probability (a decreasing function $P(\text{lifetime})$, depending on the object's lifetime) is an irreversible process - provided the object structure remains unchanged - depending on the history of existence of the object and its previously manifested properties. **Base Syntactic Construction of Language.** A propositional form - the frame for describing the properties of the object - is taken as a major unit of language. The frame is intended to provide the description of fundamental abstract objects of the empirical - phenomenological relations, and is the predicative meta frame for describing primitives of the semantic levels. **Description of Complex Phenomena.** The description of cause-effect relations between these frames forms a certain net of interrelated objects in compliance with the logic of events taking place in the changing world. The description of events - changes of the object states in time - together with the logical conditions that determine manifestation of certain qualities is the description of localization of the occurrence of physical processes in system of interrelated objects. The introduction of P function for each individual object (and the system as a whole) is the introduction of a way to describe irreversibility corresponding to the second principle of thermodynamics. Such a description allows one to relate the description of manifestation of the system properties with the description of manifestation of properties of its individual elements. It takes the meaning of the concepts (terms) - phenomenological higher level descriptions of laws of phenomena - comprehensible in terms of compositions of phenomenological lower level descriptions of phenomena. It takes it possible to give a logical formal presentation of information in the knowledge system provided by different subject disciplines.

Computer Modeling and Simulation System for Investigation, Design, Control (CMS) is developed on the base of these concepts. The Language of System is oriented to the description of phenomena laws in theoretical and empirical terms and is based on the system of notions and concepts which allows the design and investigation of models of different scales and dimensions constructed at different semantic levels, and the provision of common semantic and technological basis for various applications, i.e. for designing the model thesauruses and problem-oriented and dedicated languages.

The synthesis and investigation with CMS of biochemical mechanism models of living cell for creating the concrete cancer chemotherapy scheme - are considered as illustration of the efficiency of the approach to creation a common language and framework science.